HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Fax 206.328.5581
Tel 206.324.9530

Earth and Environmental Technologies

Letter of Transmittal

To: Idaho Department of Health and Welfare
Division of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814-2648

Date: January 26, 1996

Job No.: 2296-05

Attn: Mr. Craig Beck

Re: Avery Landing Site

We are sending the following items:

Date	Copies	Description
1/26/96	1	1995 Annual Performance Report for Product Recovery System - Avery Landing, Idaho

These are transmitted:

☐ For your information ☐ For action specified below ☐ For review and comment ☐ For your use ☒ As requested

Remarks

On behalf of Potlatch Corporation, we are submitting the attached letter report as required by the Consent Order for the Avery Landing Site.

By: Barry Kellems

Barry L. Kellems, P.E.

Title: Associate

Copies to: Gregg Rapp, Potlatch

BLK:yw
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Tel 206.324.9530

J-2296-05

January 26, 1996

Mr. Gregory A. Rapp
Construction Services Manager
Potlatch Corporation
1100 Railroad Avenue
P.O. Box 386
St. Maries, Idaho 83861

Re: 1995 Annual Performance Report
Avery Landing Recovery System

Dear Mr. Rapp:

Hart Crowser is pleased to present the Annual Performance Report for 1995 for the free product recovery system at the Avery Landing site. This letter report presents the following three sections, as required by your Consent Order with the State of Idaho Department of Health and Welfare, Division of Environmental Quality (IDEQ):

(1) **Volume of Product Recovered.** The total amount of product recovered during the first year of operation, and the destination of the product recovered;

(2) **Recovery System Effectiveness.** An analysis of the effectiveness of the recovery system with respect to free-product capture; and

(3) **Schedule.** A schedule for next year's product and water level monitoring.

System performance data (groundwater elevations and free product thicknesses) for 1995 were reported in the performance reports submitted to the IDEQ on July 31 and October 13, 1995. The initial performance report (July 31, 1995) also contained a capture zone analysis to assess the effectiveness of the recovery system.

VOLUME OF PRODUCT RECOVERED

During 1995 a product volume of approximately 100 gallons was recovered from the extraction trenches at the site and collected in the free product storage tank. The rate of recovery appears to be decreasing, with a little more than half of the volume (60 gallons) recovered between initial startup on April 10 and June 30, 1995, and the remainder (40 gallons) recovered between June 30 and the end of November 1995, when the system was shut down for the winter. Decreasing recovery rates are typical for dual-pump recovery systems, following recovery of product initially within the groundwater cone of depression. The recovered product is currently being stored on site in the free product storage tank and will be shipped off site for final disposition after a full load has accumulated.

The volume of recovered product is consistent with the presence of heavy, relatively viscous free product observed at the site. Prior to and during construction of the recovery system, a range of petroleum product types were observed at the site, from relatively light, diesel-like free product to relatively heavy, Bunker C-like free product. However, it was not clear whether the range of product types resulted from multiple releases of different products or to gradual breakdown of ligher fraction hydrocarbons from an original release of Bunker C-like free product.

Based on the former use of the site during the 1920s as a railroad roundhouse, petroleum hydrocarbon fuels potentially used at the site could have ranged from Diesel (No. 2) Fuel Oil to Bunker C (No. 6) Fuel Oil. Using specific gravity (relative to water) as an indicator of product type, No. 2 and No. 6 Fuel Oil have specific gravity ranges of from 0.81 to 0.92 and 0.93 to 1.06, respectively (Perry's Chemical Engineer's Handbook, 6th Edition, page 9-8). As stated in the initial performance report (July 31, 1995), product in the extraction wells was observed to have specific gravities (relative to water) of from 0.88 to 0.95, with the measured specific gravity decreasing downgradient along the recovery trench.

Since the recovery trench is apparently downgradient from the original product release location, the measured range of product-specific gravities appears to result from gradual breakdown of a Bunker C-like free product. In this case, product will be recovered relatively slowly, only as fast as it breaks down from the parent material and migrates to the trench. The effectiveness of the recovery system in capturing the free-phase hydrocarbons before they reach the river is discussed in the following section.

RECOVERY SYSTEM EFFECTIVENESS

The evaluation of recovery system effectiveness in capturing free-phase hydrocarbons before they reach the river is based on capture zone analysis. Specifically, a dual-pump recovery system operates by creating a groundwater cone of depression with a lower pump while skimming free product which accumulates in the cone of depression with an upper pump.

As stated in the initial performance report (July 31, 1995), the first quarter monitoring data indicated that the trenches were working as product interception trenches between the free product plume and the river. The groundwater elevation in trenches with free product was below the river level at the corresponding locations, with groundwater in trenches EW-2 and EW-4 almost one foot below the adjacent river water level. Groundwater contours showed that the flow was either from the river to the trench or flat, except possibly at the east end of the EW-1 trench. However, EW-1 did not contain any free product.

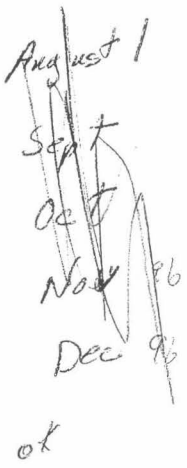
The second quarter monitoring data presented in the second performance report (October 13, 1995) confirmed that product interception was continuing under low river elevation conditions. Again, the groundwater in trenches EW-2 and EW-4 was well below the river water level and there was an essentially flat gradient between trench EW-3 and the river. Trench EW-1 did not have complete capture based on groundwater gradient contours and had begun to accumulate a small amount of free product. However, before corrective action to modify the pumping regime at EW-1 could be implemented, the system was shut down for the winter. The pumps at EW-1 should be lowered by September 1 to avoid this problem next year.

SCHEDULE

The schedule for next year's product and water level monitoring and reporting is shown in Table 1.

Table 1 Avery Landing Recovery System Project Schedule for 1996

Scheduled Milestone	Date
Startup Recovery System in Spring	April 15, 1996
System Startup Complete	May 1, 1996
Conduct First Quarter Monitoring	June 1, 1996
Submit First Quarter Performance Report	July 1, 1996
Conduct Second Quarter Monitoring	August 1, 1996
Submit Second Quarter Monitoring Report	September 1, 1996
Conduct Third Quarter Monitoring	October 1, 1996
Submit Third Quarter Monitoring Report	November 1, 1996
Submit Annual Report	January 1, 1997



LIMITATIONS

Work for this project was performed, and this letter prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar location, at the time the work was performed. It is intended for the exclusive use of the Potlatch Corporation for specific application to the referenced property.

If additional information or clarification is required, please call Barry Kellems at (206) 324-9530.

Sincerely,

HART CROWSER, INC.

Barry Kellems

BARRY L. KELLEMS, P.E.
Associate

Barry Kellems for TM

TERRY MONTOYA
Project Engineer

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